



# Combined Heat & Power (CHP)

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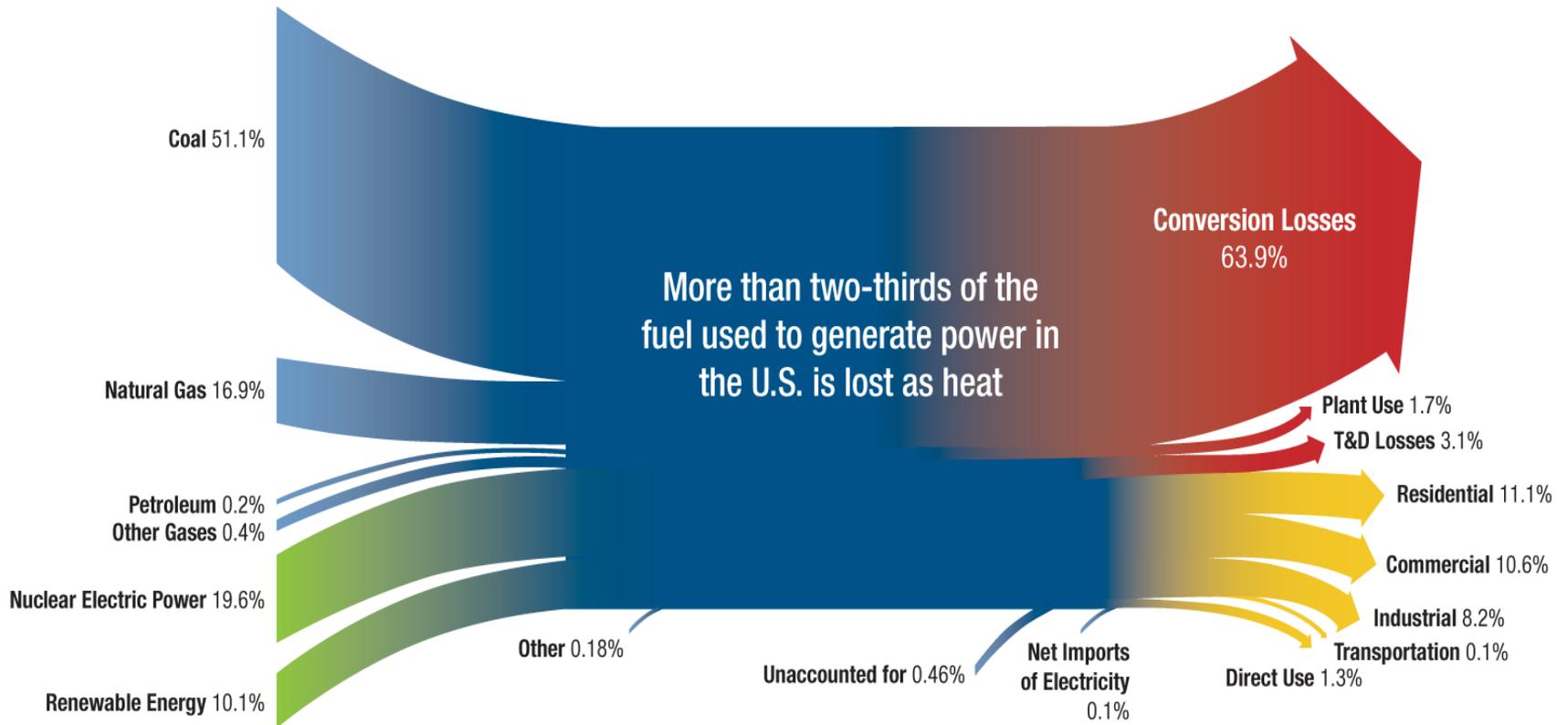


# What is Combined Heat & Power (CHP)?

**“CHP is the most efficient way of  
generating power available today.”**

*-American Council for an Energy-Efficient Economy*

# Over Two-Thirds of the Fuel Used to Generate Power in the U.S. Is Lost as Heat

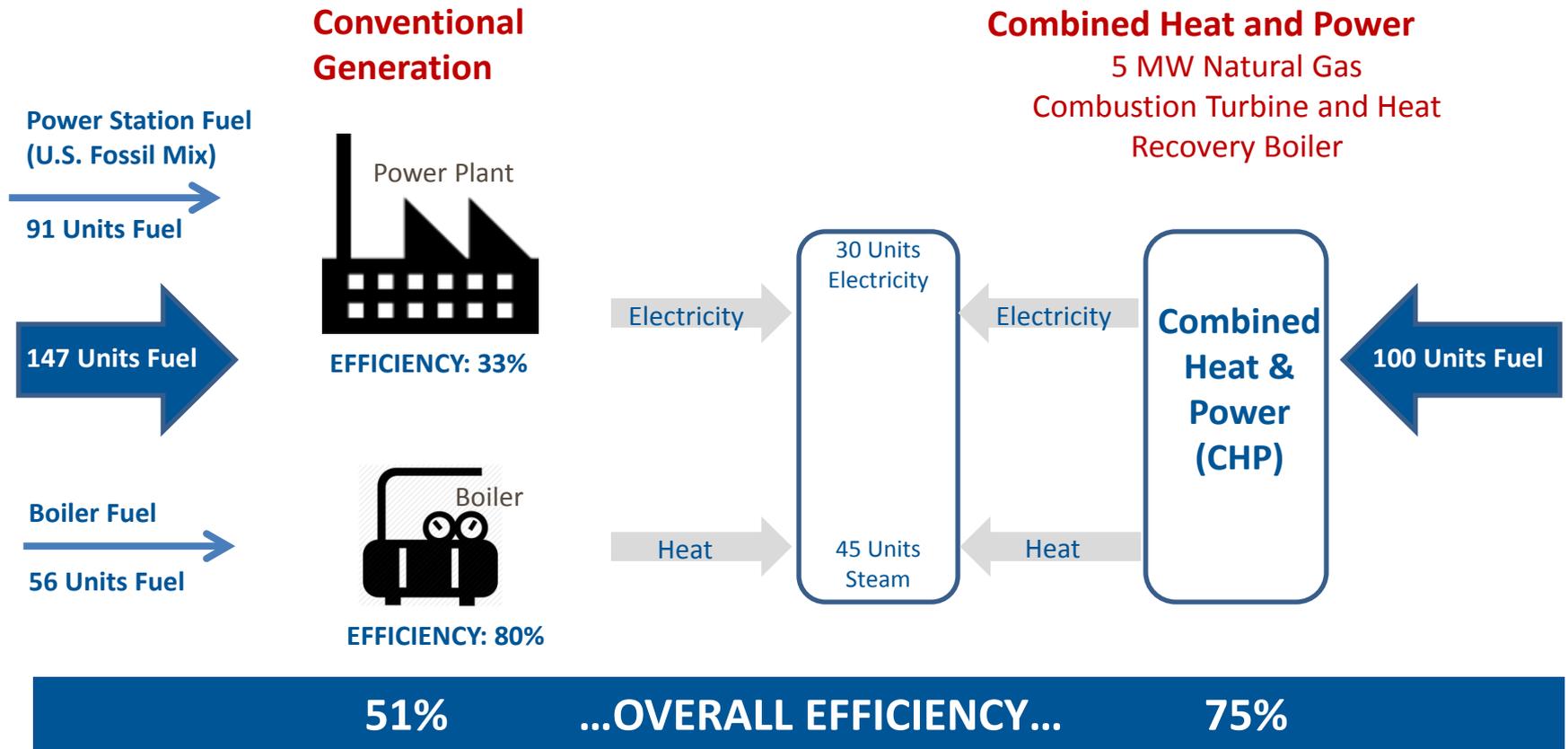


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# Big Picture: Direct Use is Most Efficient... ...so, Distributed Generation Makes Sense



# Why CHP Now?

## Federal Drivers & an Executive Order

# Regulatory Drivers for CHP

## Federal Drivers:

- EISA 2007
- EPAAct 2005
- E.O. 13424 and 13514

## Also:

Executive Order of August 2012

*Accelerating Investment In Industrial Energy Efficiency*



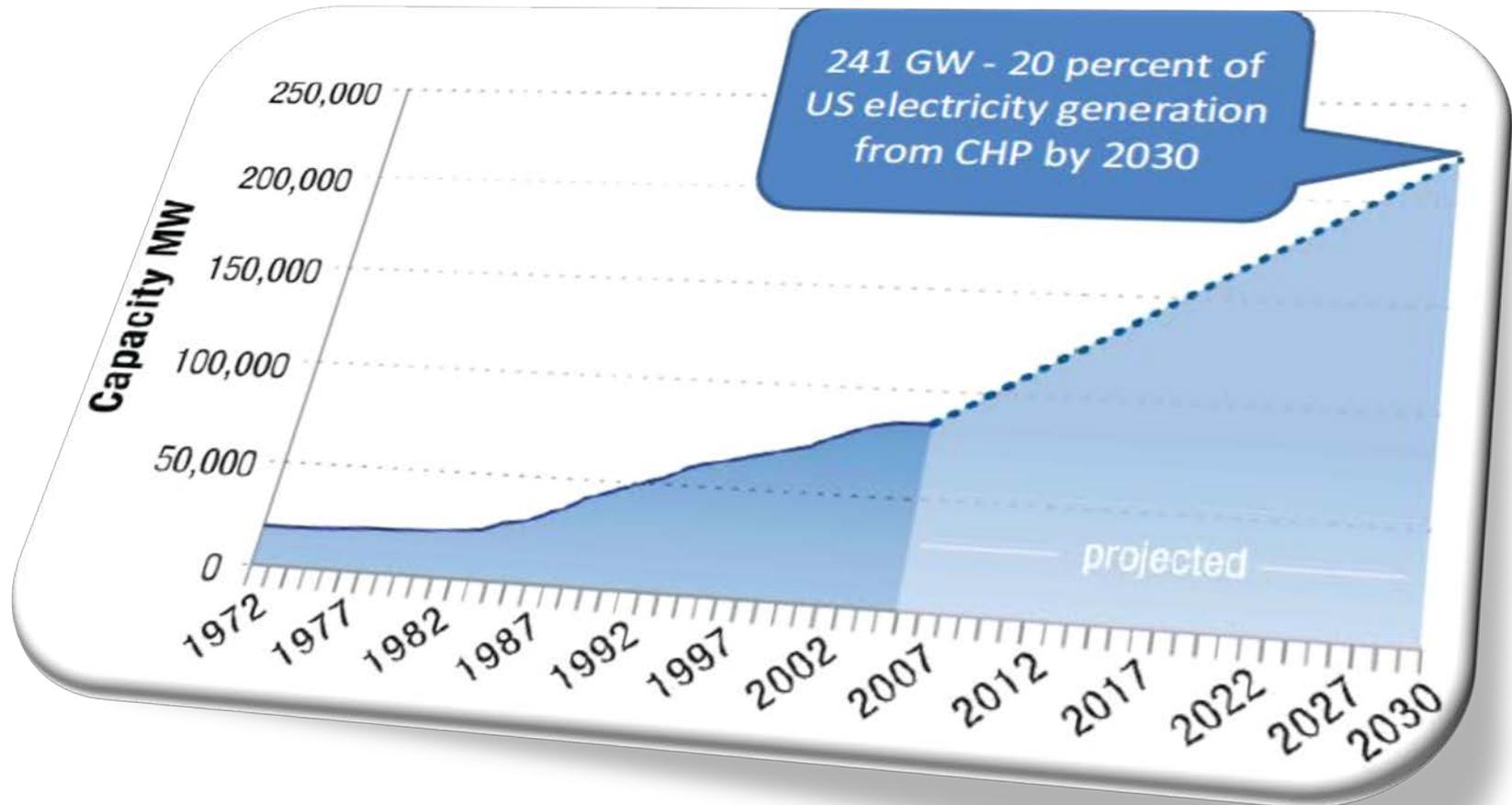
*Recognizing the benefits of CHP and its current underutilization as an energy resource in the United States, the Obama Administration is supporting a new National goal to achieve 40 gigawatts (GW) of new, cost-effective CHP by 2020*

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# U.S. CHP Generation Capacity Vision



Source: Combined Heat and Power: Effective Energy Solutions for a Sustainable Future  
Sponsored by the U.S. Department of Energy

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# What are the benefits of CHP to the Federal facility?

- **Power resilience**

# What are the benefits of CHP to the Federal facility?

**“The necessary planning and capability to ensure we have available, reliable, and quality power to continuously accomplish DoD missions from our installations in the face of such disruptions can be described as power resilience.”**

*-John Conger, Acting Deputy Under Secretary of Defense Dec 2013*

# What are the benefits of CHP to the Federal facility?

- **Power resilience**
- **Electric grid security**

# What are the benefits of CHP to the Federal facility?

One month after The Wall Street Journal revealed that the United States “could suffer a coast-to-coast blackout” if just nine power substations were knocked out, the Senate Committee on Energy and Natural Resources is scheduled to hear testimony on the electric grid’s security and reliability.

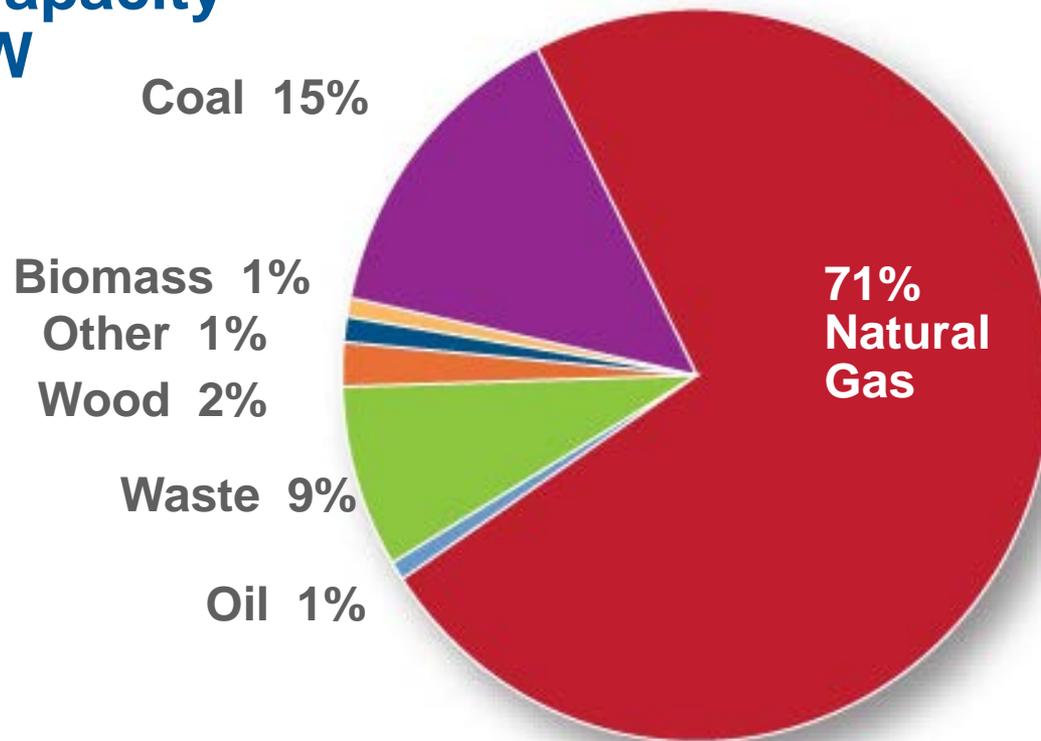
*-Alan Heuhauser (Senate Committee Takes Up Power Grid Security) April 10, 2014*

# What are the benefits of CHP to the Federal facility?

- **Power resilience**
- **Electric grid security**
- **Reduced energy costs**
- **Stability of energy costs**
- **Energy efficiency and reduced green house gases**

# Natural Gas is the Dominant Fuel for Existing CHP

## Existing CHP Capacity by Fuel – 82 GW



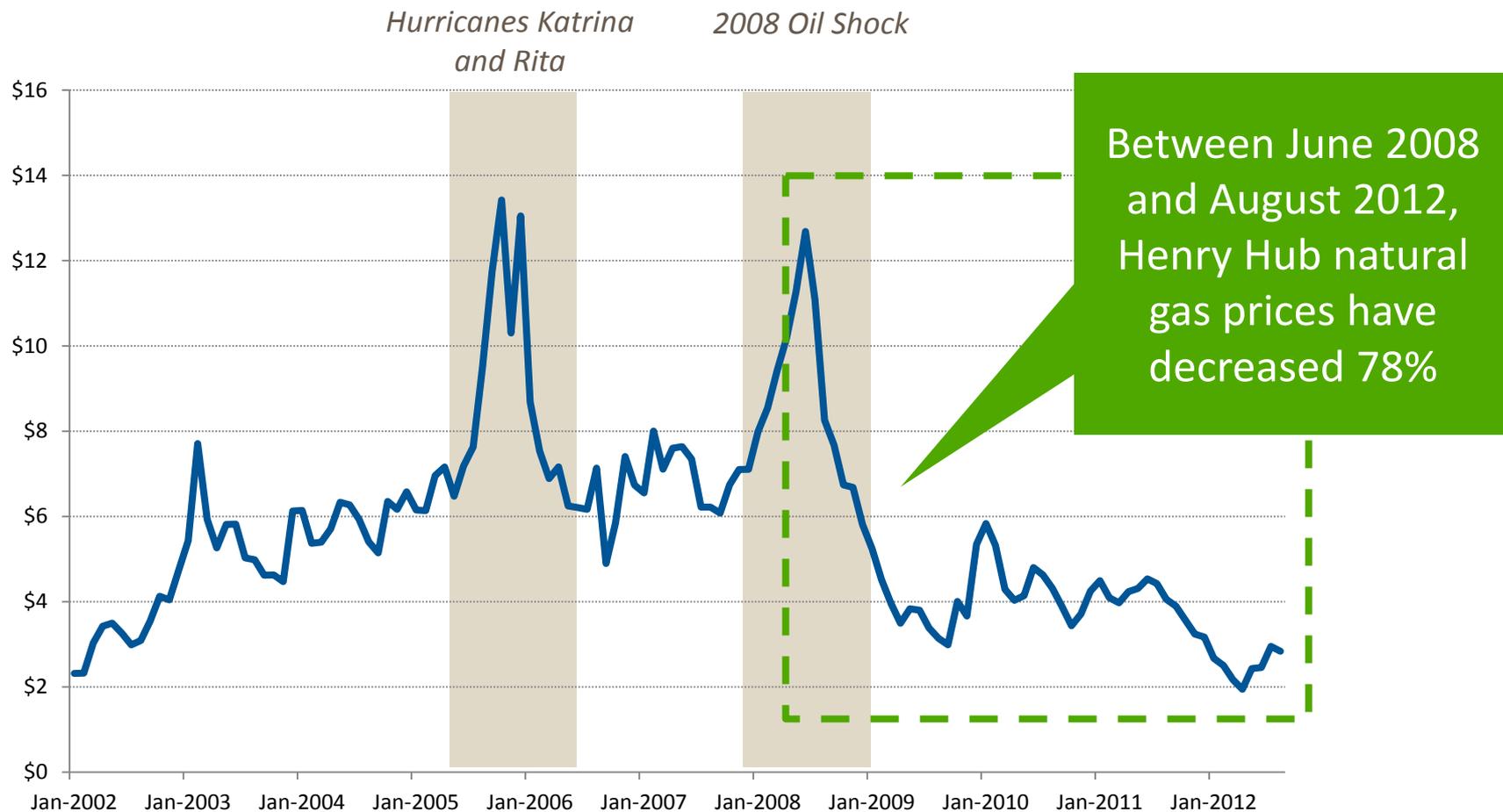
Source: ICF/CHP Installation Database

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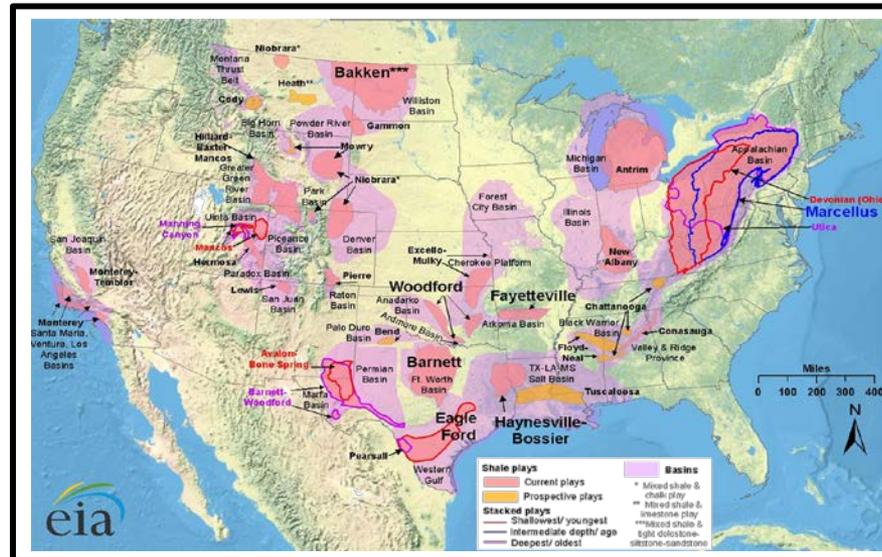
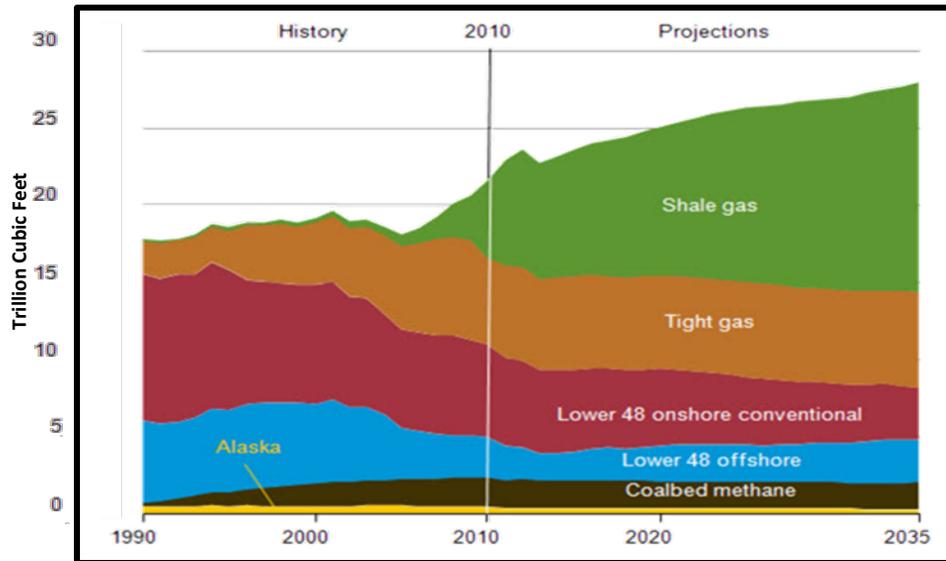
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# Changing Economics: Natural Gas Prices Exceptionally Low

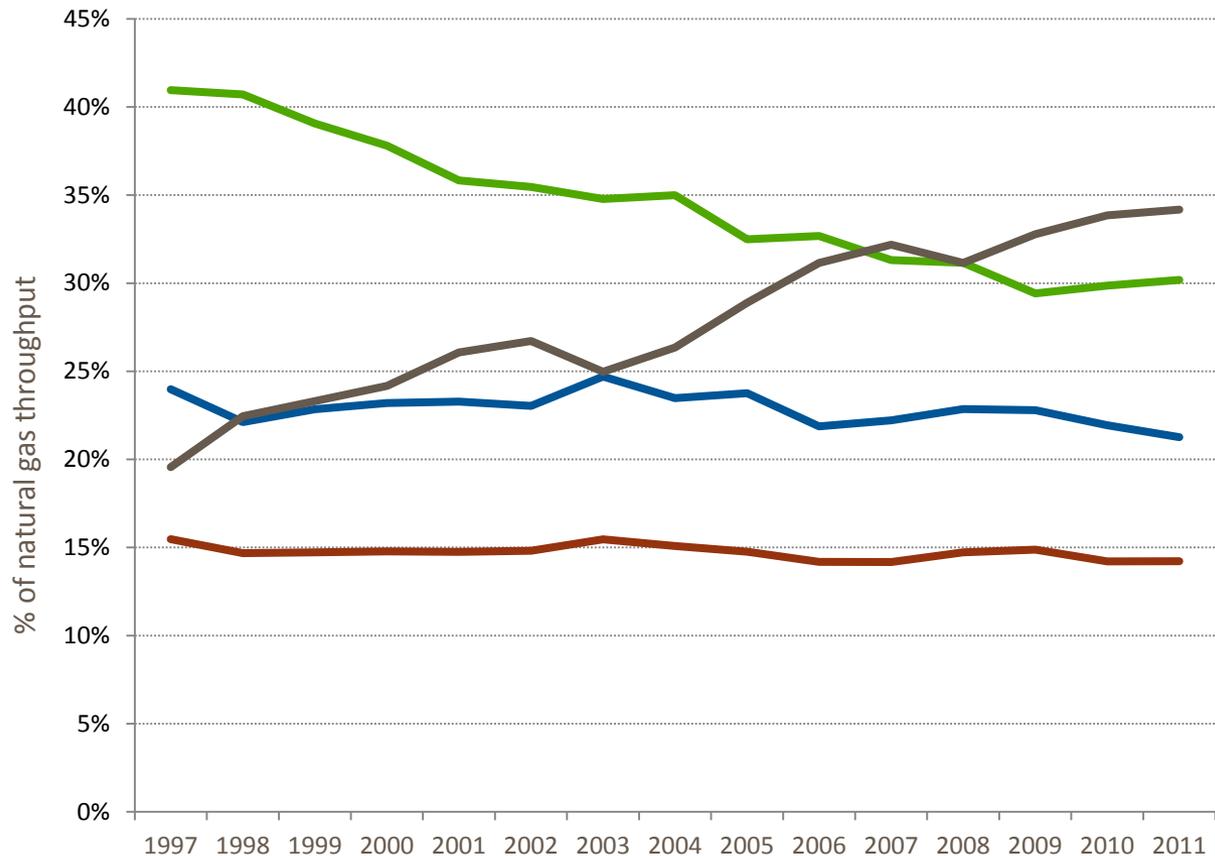


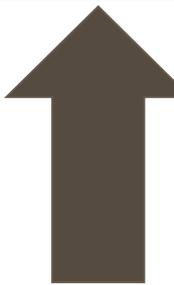
Source: U.S. Department of Energy, Energy Information Administration

# Natural Gas: American, Abundant, Affordable



# The Trends in Natural Gas Usage




 Natural gas use for power generation has **increased 87%** in the past 25 years

● Residential   
 ● Commercial   
 ● Industrial   
 ● Power Generation

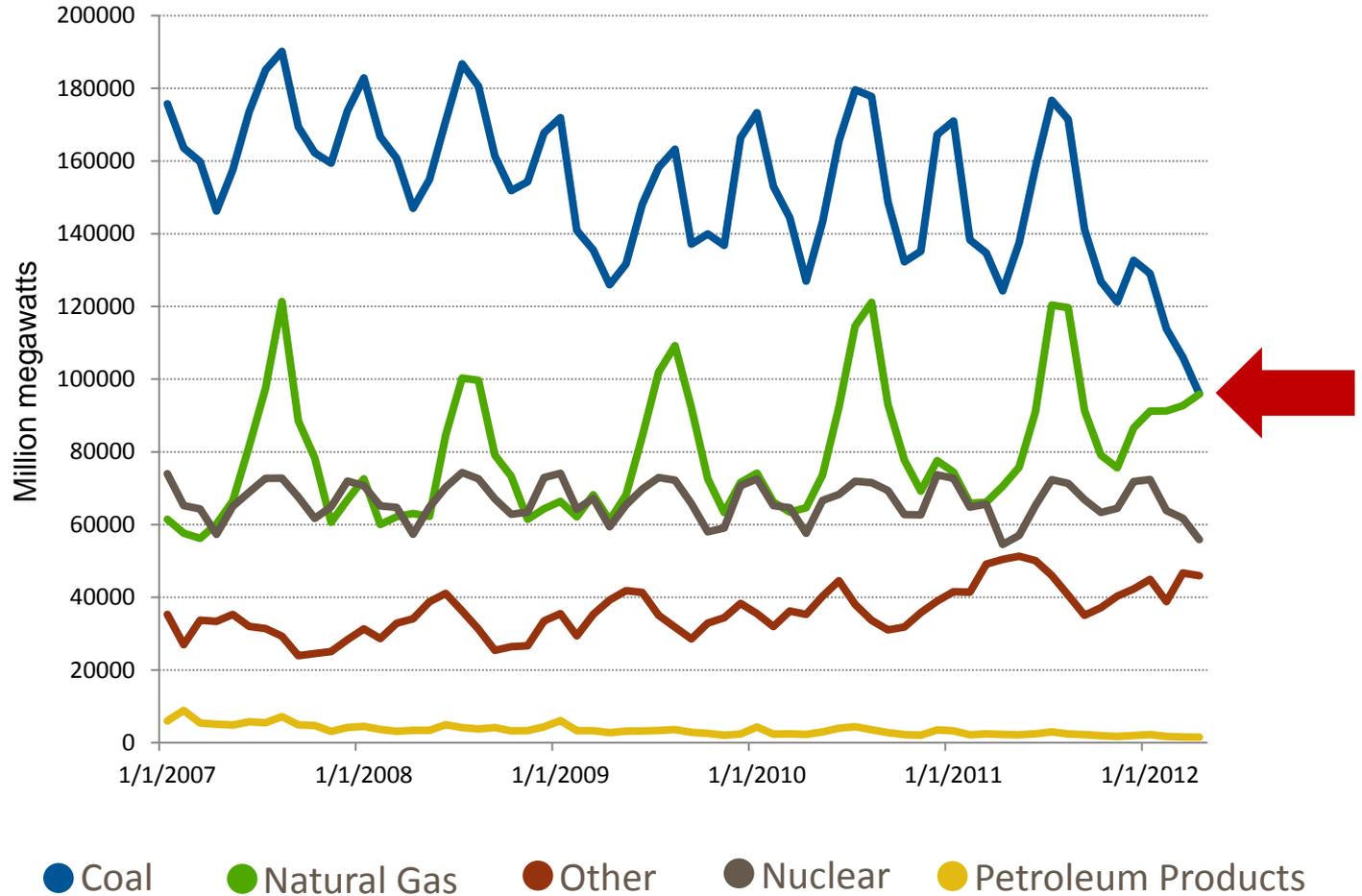
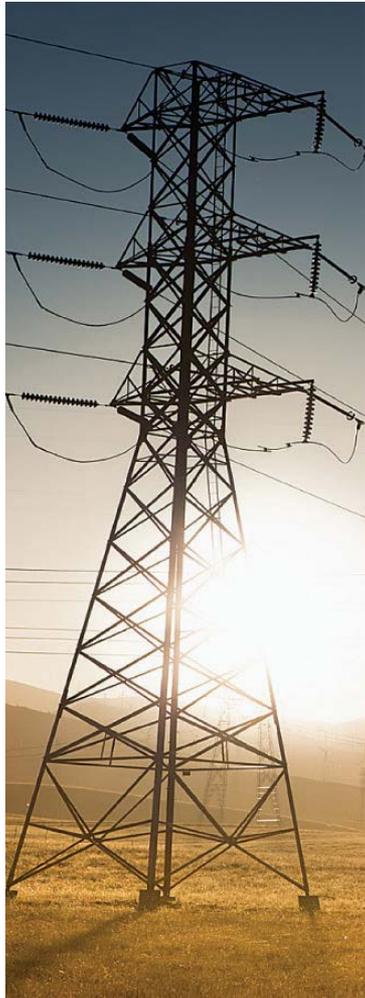
Source: U.S. Department of Energy, Energy Information Administration

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# Power Generation Mix



Source: U.S. Department of Energy, Energy Information Administration





# Thank You